

High Performance Negative Feedback Near Infrared Single Photon Counting Detectors & Arrays, Phase I

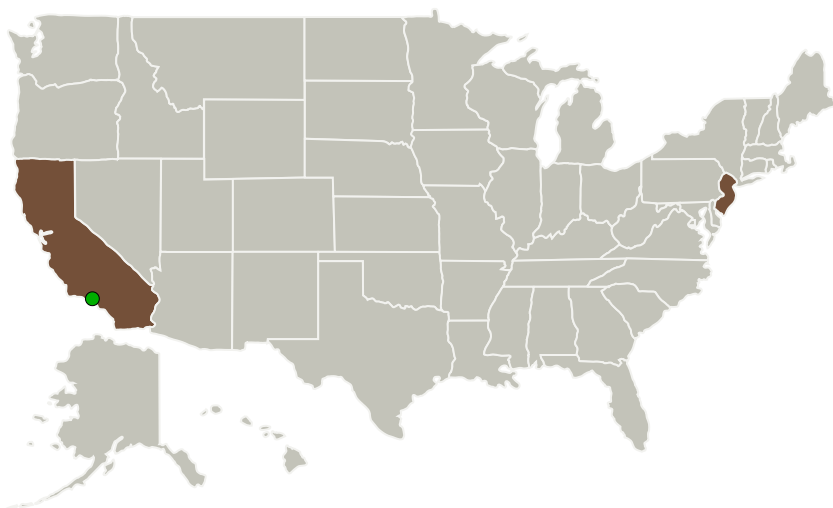
Completed Technology Project (2010 - 2010)



Project Introduction

Amplification Technologies Inc ("ATI") proposes to develop the enabling material and device technology for the design of ultra low noise, high gain and high speed near-infrared single photon counting photodetectors and arrays sensitive in the 1000 nm to 1600 nm spectral region for long range space communication applications, based on the already proven mechanism of internal discrete amplification technology in InGaAs/InP material system. We plan to achieve this by designing the InGaAs/InP internal discrete amplifier photodetector and photodetector array device structure by building on the design that gave promising results to prove the concept of internal discrete amplification mechanism in the InP material system. The primary accomplishments from the Phase I effort would be the development of ultra low noise (low jitter), high detection efficiency, very high gain and high speed near-infrared photodetectors and arrays sensitive in the 1000 nm and 1600 nm spectral region. The technology of internal discrete amplification enables the combination of high speed, very high gain and ultra low noise. This is possible because the internal discrete amplification nullifies the effect of impact ionization coefficients and prevents the edge break down, with high detection efficiency and high speed of operation. These photodetectors might also be used in missile seekers, battlefield target identification and recognition systems, and eye-safe LADAR. Potential civilian applications include fiber-optic telecommunications, remote sensing and laser spectroscopy.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Amplification Technologies, Inc.	Lead Organization	Industry	Paramus, New Jersey
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	New Jersey

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139968>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Amplification Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

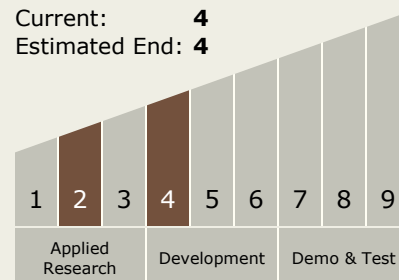
Carlos Torrez

Principal Investigator:

Yuriy Yevtukhov

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.1 Optical Communications
 - └ TX05.1.1 Detector Development

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System